

Recent Advances in Nanozymes: From Matters to Bioapplications

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Abstract

The manufacture of bionic materials to simulate the natural counterparts has attracted extensive attention. As one of the subcategories of biomimetic materials, the development of artificial enzyme is intensive pursuing. As a kind of artificial enzyme, nanozymes are dedicated to solve the limitations of natural enzymes. In recent years, attributed to the explosive development of nanotechnology, biotechnology, catalysis science, computational design and theory calculation, research on nanozymes has made great progress. To highlight these achievements and help researchers to understand the current investigation status of nanozyme, the state-of-the-art development in nanozymes from fabrication materials to bioapplications are summarized. First different raw materials are summarized, including metal-based, metal-free, metal-organic frameworks-based, and some other novel matters, which are applied to fabricate nanozymes. The different types of enzymes-like catalytic activities of nanozymes are briefly discussed. Subsequently, the wide applications of nanozymes such as anti-oxidation, curing diseases, anti-bacteria, biosensing, and bioimaging are discussed. Finally, the current challenges faced by nanozymes are outlined and the future directions for advancing nanozyme research are outlooked. The authors hope this review can inspire research in the fields of nanotechnology, chemistry, biology, materials science, and theoretical computing, and can contribute to the development of nanozymes.